

Center for Strategic and International Studies

TRANSCRIPT

Event

Delivering Space Capabilities for Warfighting Advantage  
**Fireside Chat with Dr. Chris Scolese**

DATE

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FEATURING

**Mike Dickey**

*Founding Partner, Elara Nova*

**Gen. (Ret.) David D. Thompson**

*Senior Principal Advisor, Elara Nova, and former Vice Chief of Space Operations*

**Chris Scolese**

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Mike Dickey: All right. If everyone can find their seats, we'll start back up again.

My name is Mike Dickey. I'm one of the four founding partners of Elara Nova. And we're privileged to be partnering with CSIS for today's event. And we started Elara Nova two and a half years ago with the central purpose to advance national security space by trying to create meaningful connections between the four interdependent segments of our business. And that is the warfighters who rely on space capabilities to be there when they need them, the industrial base that can create combat-effective systems, international partners with whom we have to interoperate to be able to operate anywhere around the globe, and finally capital markets who can create speed and scale through their deployment of capital.

And events like this today at CSIS really help us to create the context around those connections. World events also give us context, right? And so I ask, how is it that in the year 2025 we're watching a war in Europe that looks like World War I, with static front lines, with trenches, with an incredible cost of human lives that really have no strategic impact on the battlefield? And the answer is that neither side in that conflict owns the high ground. And when you're in a small, geographically confined area like the eastern part of Ukraine, the high ground is the air. But if you talk about a conflict that might span a third of the globe, like we might have in the Indo-Pacific, the high ground has to be space.

And without space, we could see – like we're seeing in Europe – we could see a conflict in the Pacific that looks like World War II, where 150 Navy ships and tens of thousands of sailors and Marines went to the bottom of the ocean. And let's not forget how the conflict in Ukraine started. It did not start with Russia advancing across the border. It started with a cyberattack on a space system to try to disrupt the command and control of the Ukrainian military. And there are more lessons from this conflict. The stunning pace of innovation is a lesson that we also need to heed. We saw a third of Russia's strategic bombing fleet destroyed not by high tech, but by relatively low tech, but in numbers at scale and with bold employment concepts. So where is the U.S. applying such innovation and learning these lessons?

And who better to help us to make sense of all that context than the two gentlemen we have, the influential space leaders of our generation? We're honored to be eavesdropping on a fireside chat between General DT Thompson and the honorable Dr. Chris Scolese. These two individuals have been a guiding hand in the transformation of national security space over the last several years. And I, for one, will be interested to hear maybe them reflect on that path and, more importantly, their views regarding the important next steps that we have to take on the path that they've blazed for us.

General Thompson, he's a 1985 graduate of the U.S. Air Force Academy and an Olmstead Scholar, lifelong space officer in all parts of the national security space business. And he was in the trenches in the months and years that led up to the creation and the stand up of the United States Space Force, which made him the perfect choice to be its first vice chief of space operations. Now, post-retirement, General Thompson does a lot of things. He's a senior principal advisor for Elara Nova, which we love, but I'm going to go out on a very short limb here, General Thompson, and suggest that your favorite professional pursuit is teaching astrodynamics and space engineering to the Air Force Academy cadets as the distinguished visiting professor and the Bernard Schriever chair for space systems engineering. And, in fact, I'm wondering if you were supposed to be in class today. (Laughter.) I'm thinking Tuesdays and Thursdays is his class, or something.

General Thompson's guest at his fireplace, which Kari, I will say, is conspicuous in its absence at the fireside chat, is the honorable Dr. Chris Scolese, the 19th director of the National Reconnaissance Office, who started his public service career as an officer in the nuclear navy after graduating from State University of New York, and eventually a Ph.D. at George Washington just down the street here. Joined NASA in 1987. And for 25 years made a long-lasting impact on space science and engineering. First, at Goddard Space Flight Center and all the earth science programs which he ended up running, and then from the trenches, where people love to solve problems. If you're successful, they bump you to corporate. So he got bumped to corporate at NASA headquarters with the associate administrator for all of the space science program, which meant his purview is not just the Earth, but unlocking the mysteries of the entire universe. Some portfolio that one, huh?

He then shuttled back and forth between Goddard and the headquarters. He was actually acting administrator of NASA for about half the year in 2009, before he was able to go back home in 2012 and become the director of the Goddard Space Flight Center, which has the nation's largest organization of scientists, engineers, and technologists. And it's from there that, in August of 2019, he was actually the first director of the NRO to go through all the processes of being presidentially appointed and Senate confirmed. And I looked at the mission description on the website. And I thought it was really good. It said the NRO develops, acquires, launches, and operates space-based assets and ground systems to see, hear, and sense threats around the world in real time. And the NRO does that exceptionally well. And for those of you who get to travel in those circles, the past six years under Dr. Scolese's leadership, have witnessed a stunning transformation of how the NRO accomplishes that mission. And I trust that General Thompson will take us there today, as these two generational space leaders engage in their conversation. Enjoy. (Applause.)

General David  
Thompson (Ret.):

All right. Mike, thanks for that introduction. So, to get you started early on questions, like Sarah Mineiro, I can't speak binary. But I can speak Greek – not ancient Greek, but engineering Greek. (Laughter.) So if you want to give me some of those questions, that'll be all right. All right.

So, Dr. Scolese, thanks so much for joining us here today. And more importantly, thanks for the service you've given to the nation over a long career, but specifically over the last six. And one of the things, if I remember correctly, that I learned in the last year or so is you weren't just in the nuclear navy. You were one of the last true Rickover babies that actually went through the crucible of the interview with Admiral Rickover himself. So not many of those folks left. But, you know, obviously performing at a high level and knowing how to operate under stress since the earliest days of government service. So why don't we start where Mike left off? Not the longest serving director of the NRO, but pretty close. Couple have served seven years. You've done it for six years. And a few things have happened in those past six years. How about telling us a little bit about what you believe are the most significant accomplishments that the NRO has achieved over your tenure as the director in these last six years?

Chris Scolese:

Sure. And, thanks, DT. Thanks for all those nice words. And, Mike.

You know, I would say, you know, over the last six years, there's a number of different things that that have happened. As many of you know, the NRO has a workforce composed of the military, principally the Space Force – at the time I was there, it was principally the Air Force, but since the creation of the Space Force, it's largely Space Force – the CIA and then its own cadre. When I got there it was a relatively small cadre, and now it's grown significantly. But the important thing is that the workforce has thrived. I mean, no organization can accomplish anything without an incredible workforce. And we've been very, very fortunate to acquire the very best of the Space Force and other military services. Same is true from the CIA and also the cadre. So I would say one of the accomplishments is really bringing that workforce together and focusing it on the challenges that we have to do.

It was also a time, as was mentioned earlier by Mike, of a real change in the – in the outside world, both in terms of the threat that we were dealing with and in terms of the technologies that were becoming available to us, and the opportunities to partner with industry. So I would say the other area that – just to mention, you know, two areas – the other area is how quickly the NRO was able to adopt, you know, new thought, new capabilities, be innovative, and go off and deliver a world-class capability. You know, just as an example, you know, over the last not quite two years we put 200 satellites on orbit. That's a real change in the way the NRO has operated. It's a real change in the way we're delivering capability to our customers.

You know, they go all the way from the president to the warfighter in the trench to the first responder that's going off to deal with a natural disaster, or the analyst that's out there. And that's really the adoption of technology and incorporation of a lot of commercial capabilities and practices into our organization to make that happen. There's many more, but those two, I think, are good.

Gen. Thompson: OK. Very good. So the month you became the director of the NRO, August of 2019, U.S. Space Command, the joint war fighting command for space, was recreated, right? It had been disbanded some 17 years earlier. And then four months after that, brand new military service, first one in 73 years, U.S. Space Force was created. So here you are, the adult in the room with these brand new infants trying to figure out how to partner with them. Were you partners? Were you customers? How did – how has that relationship developed over the last six years, in terms of the way you work with and support each other, both U.S. Space Command and then U.S. Space Force?

Dr. Scolese: You know, I think it started off great, because in my confirmation hearing it was really our confirmation hearing, because General Raymond, who at that time was commander of space –

Gen. Thompson: He was commander of Air Force Space Command, right. Correct, yeah.

Dr. Scolese: He and I testified together. And I think that indicated how we were going to operate together. We were going to be a team. They asked us a lot of questions trying to see where the differences were, and they didn't find them. And I think that's still the case. I mean, as with any organizations that work closely together, yeah, we have our friction points every once in a while. But fundamentally we recognize that if we're going to be successful, we have to be successful together. And I think over the time, and of course you were there at the same time, we worked, you know, extremely well together.

It's only gotten better over time as we've matured together over the years. We've recognized our strengths, taken advantage of them, shared responsibilities on some things, and just stepped back and said, nope, that's yours. And we've gone off and worked. And then when you think about it, I mean, as I mentioned, Space Force is the largest military contingent, and one of the largest in the NRO. Space Force is with us every single day. Operates the satellites, is developing new capabilities with us, is there in our very early stages where we're doing research and development, in the development, in the acquisition, in the launch, and all the way out to operations. So we are very much – we are very much joined together at Space Force.

And the same is true with Space Command. At Space Command, we need to know what's going on in space. I'm sure we're going to talk, and you've heard

probably earlier that space has really become a contested environment. It's challenging to operate up there. There are forces that don't want to see us operate up there. So Space Command, we work very closely with them to understand, you know, what the situation is in space, what we need to do, how we can best optimize our collection strategies, and how we can share information so that that Space Command could do its job better. But Space Command helps us do our job better as well. So we work very, very closely together.

Gen. Thompson: Yeah. And, as some in the room know, the history of NRO, all the way back to its origin, was very closely connected to the United States Air Force, the United States Navy, and CIA. And even in organizational changes over the decades that connection has remained very close. In fact, Major Mike Dickey and Major DT Thompson in the mid-'90s helped orchestrate the three-times-a-year summits between directors of the NRO and Air Force Space Command commanders. And I'll say, in those in the years since, the common theme has always been the collaborative nature of the directors of the NRO. And you're the most recent, and perhaps the most collaborative just in terms of what do we need to do to work together. You know, like you said, occasionally have friction points, but that relationship is decades long and enduring. And I think you're exactly right, is – the names have changed a bit, the organizations have changed a bit, but that relationship and that nature have served both well over those years.

Dr. Scolese: And, I just learned something. And that forum you set up continues to this day. (Laughs.)

Gen. Thompson: Yep. It does. OK, so now let's talk about something that has grown up. Now, the growth started before you became the director, but it certainly blossomed in the last six years – commercial space. And I just don't mean commercial space in general, right? We've had – there has been a relatively long history of some level of commercial ISR, primarily imagery, electrical optical early on, but it's expanded to be multispectral. There's now commercial synthetic capture radar capability out there. There's RF sensing. There's a tremendous ISR capability out in the commercial market, not just in terms of numbers of offerors, but their ability to cover the globe.

The quality of the products and services and data have grown. Now none of them currently, and probably for the for the long future, can do so with the level of performance in the exquisite nature that you all have. But how do you see that relationship? And how do you parse out the things that commercial ISR can and should do for the nation, versus what the traditional NRO mission has been? And do you have a relationship with them in that regard?

Dr. Scolese: Yeah. So let me broaden it a bit. Commercial has become more important over these last six years than it was even before. Certainly, in the imagery it is

now vital. I mean, we have changed our architecture to recognize that commercial imagery can address a lot of the questions that need to be done there, so that the – what the NRO provides is very focused on those things that cannot be done or have no commercial value, but are needed by either the warfighter, or the analyst, or the policymaker. But it's expanded into radar, as was said, into RF now, to be able to go off and do those. Those are a little bit more nascent – radar more mature than RF, but RF getting there very, very quickly. And then into other areas.

So we have gone off and made it much more available for these organizations to be able to participate in what we're doing. So with the imagery, recognizing how mature it is and how it can actually take on very important requirements for the U.S. government, we have a contract with them. With the others we have various other kinds of arrangements that provide more flexibility, that allow the provider to learn about the NRO and learn about what the government needs, and for us to learn about them. And, you know, the intent is eventually, as they mature, we will go into contracts. And we will adjust the way we go off and do things. So that's matured, you know, an awful lot. And I believe we're doing very, very good in that area right now, and we're very much relying on our commercial partners.

But commercial is broader than that. I would say that, you know, as we – as we look to where we are today, one of the big changes was commercial launch. It really reduced the cost of launch. And that enabled us to do a lot of different things. When launch was expensive, you didn't want to put a cheap thing on an expensive booster. (Laughs.) That just didn't make sense. But now that we have launch being reduced in cost, increased in frequency, that gives us more opportunities to launch, so we can experiment more. We can put additional – we can put spacecraft up there at a higher pace with shorter lives to go off and demonstrate technologies, demonstrate capabilities, and really allow us to go off and mature those things that we're going to want sometime in the future, but we don't want to wait, you know, for years and years to go off and mature it as part of a set of requirements. We want to get that proven now so the community can see the value of whatever technology it is.

So commercial launch has helped us there. It's also helped us with the reduction in cost to allow us to actually think about proliferation. Proliferation offers lots and lots of benefits. You know, resiliency comes to mind, but it also allows us to have a much faster revisit time so we can deliver information faster and in a more timely manner. If launch was expensive, you couldn't think about putting multiple satellites up. That leads to the next part of it. As, you know, the need for communications around the world has gone up, and we've seen communications architectures proliferating, there's the opportunity to get commercial buses. Buses, if you will, that come off of a production line. That has also helped us, you know,

significantly. So taking advantage of those commercial aspects has really, you know, allowed us to move faster, get technology out there quicker, increase resilience, support our customers with data being delivered faster and in a more relevant time frame for their needs, and made it harder for our adversaries to hide, because we can go off and get things up there.

It's also allowed us to bring in new ways for us to think and engage with our more traditional companies that we deal with – contractors and team members that we deal with – for them to see new ways of producing things that have now made it, you know, even more efficient for us to go off and develop the more exquisite systems that we need to address the most sophisticated problems that are out there. So it's been – you know, been very good. We brought new vendors because of the commercial aspects of it. I think overall it's allowed us to have a much more efficient architecture and deliver a much better product for the nation and the communities that rely on us.

Gen. Thompson: You – in talking about commercial launch, you talk about – you reference the technology development and experimentation program that I think is one of the key ingredients of the secret sauce that is NRO's success. You know, and those who know the history and where you can talk about in the right levels, there is a long history of experimentation, development to look at the next-generation of technologies and operating concepts that might serve the NRO and its customers well. One of those emerging technologies that the – not just the national security space or national security communities face today is – but is faced by everyone – is artificial intelligence, the advent of AI.

And whatever a person's opinion is about the expansiveness or possible uses of AI, it would certainly seem like a tool tailor-made to help enhance the NRO's mission when you think about the ability to take vast amounts of data, and make sense of that data, and find things, and fuse things. And when it comes to collecting it, and exploiting it, and disseminating it, it seems like AI is a tailor-made tool for the ISR mission. Can you talk to us a little bit about your perspective, and what the NRO's doing with respect to AI and being able to apply it to customer needs and NRO missions?

Dr. Scolese: Absolutely. Those of you who know the space community know automation has been there from the beginning. Sixty years ago when the NRO was created we had to rely on automation with our spacecraft, because the one thing that you know – at least for now – is once we launch it, we can't touch it. So it has to have some degree of ability to make decisions. Now, obviously, you know, in the beginning they were simple decisions. Everything's going fine, I'll keep on doing what you tell me to do. Oh, I'm confused, I'm just going to go into the fetal mode until you tell me what to do. But it's gotten, you know, certainly much more sophisticated than that.

So we were looking at AI, you know, a number of years ago because it has – it's needed when you have a proliferated architecture. When you think about – without going into details because that would be difficult – when you think about, you know, the way it's been before, when you've had a few satellites, the tens of satellites, you can think about what you want a satellite to do. When you have 200 satellites or more, you have to think about what the constellation can do and figure out how the constellation can find a way to address your particular problem. Which means you have to change things on the ground and change things in space. And AI is absolutely critical to go off and take in all of the variables that go into there to address whatever the intelligence question or the military question that needs to be answered, as opposed to saying, hey, satellite X, go off and look at this. So you want – you want to figure out the best way to go off and do that.

It's also critical for us in the management of that constellation, in the sense of I now have many more satellites that I have to deal with, all of which can have problems, right? I mean, it's not like everything just works perfect every day. So you want to be able to go off and address those very, very quickly, and help the operator to be more efficient in their management of the constellation and dealing with it. The ground stations that we have, you know, therefore also need a lot of automation so that they can bring in all of the data that's coming down from the satellites, provide that to the operator in a format that's very useful. So AI plays a – you know, a huge role in there.

There's lots of other things of that dimension that we could talk about, but I can't in this forum. (Laughter.) You know, and then, you know, to help our colleagues in other organizations, like NGA, or CIA, or out in the field – as all of this data is coming down, to give it to them in a format that is more useful for them, that reduces the amount of time they have to go off and look at images or look at signals, is another area that we're working. And this kind of goes outside of, you know, the NRO, and is our teaming with our partners as to how we can best go off and do that, so that we can – we can minimize the workload there and allow them to operate in the most efficient manner and give them the information that they need, you know, critically.

And then, you know, AI is now part of our everyday life. The NRO just recently, knock on wood, although we don't need to knock on wood, had its 17th consecutive clean audit. Back when we did our first consecutive clean audit, if you can say that, you know, it was in a very different time frame. Now, AI is actually part of everything that we're doing, in our financial works, in our tracking things, you know, to – in designs, to go off and make sure that our CM, configuration management, systems are correct. Minimizing, you know, tedium there, but also maximizing performance and minimizing errors has become, you know, really, really critical. So AI is part of everything that we're doing. And how we go off and advance that would be something that would be a fun thing to talk about.

Gen. Thompson: Yeah. Well, as a member of a service and the Department, then, of Defense, now the Department of War, that is still on a multiyear path to try to get to its first consecutive clean audit, you know, this is just another example of the excellence demonstrated in the NRO in any number of ways and sectors. And, as folks here in the room know, this morning we've had a lot of conversation about acquisition. And we're looking again in other areas at the speed of acquisition, the quality of the acquisition products delivered, how well they support customers. The NRO has a long history and a well-deserved reputation, without a few – you know, there are a few blemishes – but a well-deserved reputation for quality in its acquisition processes, the types of systems it delivers, how well they work, and how well they support their customers. What would you say are the key ingredients in the secret sauce that is NRO acquisition? And why does it serve both the NRO, but the nation, so well?

Dr. Scolese: So, I'm not sure it's a secret. But I would say some of the key ingredients are a very focused mission. We focus on ISR and all of the components that go into delivering that product. We're a very flat organization. Between myself and the junior engineer or junior accountant that's working it, there are three levels. So decisions can be made very, very quickly. You know, from the time a problem is identified until we're aware of it and can provide help or encouragement is very quick. And that helps a lot. So the speed of decision is because of the very flat organization we have.

The other is we have – all of the elements are there. So we have contracting, legal, finance, budgeting, as well as the engineering and the science research, development, operations, launch, are all, you know, in the organization. So we can touch all of the pieces. Now, we rely on partnerships for a lot of those things. Launch is a particularly good example. I mean, we rely on the Space Force for launch. We work with them for the vast majority of our launches. There may be a few here and there where we go on our own to get a launch vehicle, but the vast, vast majority of them are there.

The other is we have the – you know, from literally the very beginnings of an idea all the way to operations are in the organization. So we have, you know, a research and technology organization. The former director is sitting back there trying to hide right now – (laughs) – of that organization. Where we are looking, you know, not only five years out and 20 years out, but we're also looking at today, and how can we take those technologies and bring them in? That's where we have the relationships with academia, with the research community, with the labs, to see what's out there, and what is potentially out there that can solve a problem in the future or solve a problem we don't even know about. So we do a lot of experimentation there to get ourselves prepared for when it comes so it doesn't take five years to add a technology. We're ready when the time is there and it's mature enough.

And then, of course, we have the design development, which we typically do with our partners, the acquisition launch, as we were talking about, and operations. We learn about what's going on in operations as part of us. We'll find out which part of the system is really, really valuable, which could – which may require some tweaking, and which is not used. And then we cycle it back and make it work again. And then, of course, underpinning all of that, is the most important ingredient, our people, right? We have absolutely incredible people.

And the fact that we're composed of three major elements – military, CIA, and cadre – means we don't have absolutely incredible people, we have people that are all thinking differently, and bringing different ideas, and bringing different viewpoints from their parent organizations that come in and challenge the status quo each and every day. Which allows us to, you know, continue to advance and develop and address, you know, whatever challenge or threat or problem that comes up. So I think that's a long-winded way of answering a question about streamlined. (Laughter.)

Gen. Thompson: All right, well, let's – I've got one short story about streamlined acquisition and then we'll come back to people and talk a little bit more about that. But not many people know – it's not widely known, I don't think, is as we were developing the potential concepts, and ideas, and plans for the Space Force, and what it might be, there were, as you might imagine, among the national leadership in the White House at the time, in the Pentagon at the time, in the Congress at the time, a small but relatively powerful contingent of national leaders who were certain that the problem that needed to be addressed and fixed was really only about acquisition of space capabilities. The organizations were fine. You know, the structure was fine. The operational piece was fine. The issue was all about acquisition.

And this small but, powerful group, was insistent that the answer to this problem was to give all national security space acquisition to the National Reconnaissance Office. Which would have been just fine in that regard. But there were other folks out here who thought there were some other issues that probably had to be addressed. And ultimately, the answer was what you see today. But, I mean, the reputation of the NRO and the acquisition – and its acquisition process and success was so powerful in those days, and still is today, that one of the answers in the early days of what should a Space Force look like, the answer was you don't – well, the proposal was, you don't need a Space Force. You just need to let the NRO do all of our national security space system acquisition, and everything else will be fine. That is the reputation that exists still today about NRO acquisition.

So let's go back to people. And, as you stated, the success of so many organizations is not exclusively the workforce, but it doesn't matter how

good your technology is and other aspects of your organization are. If you don't have great people, you're not going to have a particularly successful organization. You pull from CIA. You used to pull from the Air Force, now the Space Force. You do pull from other services. You also hire folks in from other areas. You know, and you create the NRO cadre. In the past, you were competing with national security organizations, with NASA, as you know. You're now competing with commercial space.

And given the – let's just say, the publicity around that, and some of the levers that they can use to entice high-quality people into their space organizations, how do you continue to compete not just with those who want to perhaps come to work for government and see NASA and see others, but how do you compete with the commercial space market as well for the very high quality, very talented folks that you absolutely need in the NRO?

Dr. Scolese:

So that's – you know, talking about the CIA and the military is very different than talking about cadre. So I think your question is more about how do we do it with cadre. And in some respects, it's the same for everybody. I mean, the initial – I suppose I should take a step back. The NRO doesn't exactly advertise, right? I mean, we can't go out there, like my former organization, NASA, and, you know, say all the great things that we do. So that doesn't really exist. But we do have a reputation. And, you know, clearly in the CIA and the military, it's a little bit easier to see it. In the wide-open public, a little less so, but there's still a reputation out there that there is this other space agency out there, the NRO, that does neat things. And that helps us.

And what we found is when we go off and we talk to people that – you know, universities is an obvious place, but also at job fairs, and that. When we tell them about our mission, even in a generic sense, there's an excitement there. And then when we can bring them in and they can meet, you know, the people that are there, they can see, you know, the commitment and the dedication and the excitement of our folks. And they want to come and work for us. So that's really good. But that's kind of more opportunistic.

We recognize also that that we have to build a pipeline of people. So about five years ago, a little bit more than that, we started up our intern program. Which has been very, very successful. We want to get students in their – you know, at the end of their first year of college, and bring them in, get them their clearances, and allow them to see what we're doing and actually participate in work and I really mean that. We don't just let them go to the library and look at books, or ask them to go off and, you know, file things, or do a computer program. We actually engage them in the design, development, testing of the satellites, or the operation of the satellites, or in the R&D areas that we're doing – research and technology areas that we're involved in.

So they get to see it. And they usually come back, right? So we keep them in there, and then we have a pipeline where we can hire those people right after they graduate. We do the same thing with graduate students. It's a little bit different because, you know, they've obviously graduated and it's a little bit of a different process, but same general idea. We want to work with them and make sure that they see what their future is at the NRO. And then after that we do – we struggle to compete with industry in terms of compensation. But we do provide, you know, certain levels of compensation, you know, with various allowances that we're allowed to have, the opportunities to go to graduate school, those types of things.

But I think the main thing that keeps people engaged at the NRO, and I know it certainly is for me, is the mission. I mean, you're doing something that has real value to the nation, and really to the world when you consider our international partners that we participate with. And we know where our information is going to. So that is, you know, number one. And I would say number two, we are pushing technology every day. And what engineer, and what scientist, and what mathematician doesn't want to be there, right, taking on the hardest problems and solving them? I think those two things are really, really what keeps people in the NRO. And when they get their chance to open the door a little bit and see what we're doing, brings them into the NRO.

Gen. Thompson: Just get them in the door, right?

Dr. Scolese: Yeah.

Gen. Thompson: Yeah, yeah. All right, let me get to a couple of questions from the audience out here. I've been asking all the questions I always wanted to know about, but. (Laughter.)

So first, Dr. Dixon gave us one: Do you see a world – this is an acquisition question – do you see a world where we just decouple hardware procurement from software procurement? Maybe like the smartphone model, right? Somebody delivers the platform, and a whole bunch of other people – either the operating system or maybe apps on top of it? Or is this going to be – are we going to have a coupled – the software comes with the hardware, comes with the satellite, comes with the ground system, for the foreseeable future? What do you think about that?

Dr. Scolese: I think on the ground systems, we're there or getting there, because, you know, we have the opportunity to really, you know, move things around a lot faster there. And it gives us the opportunity to test things out. So I think when you're talking about, you know, specifically, you know, how do we use the data that's coming off, how do we process it to deliver it to a customer, we're doing that a little bit. But I think we can definitely go much, much

further than that. When you're talking about on the spacecraft where we're actually, you know, building it, I think there's – you know, I mean, we're seeing a little bit more flexibility in spacecraft systems. And certainly we upload new code on a regular basis. But probably less opportunities for the space systems part, more opportunities on the ground system part.

Gen. Thompson: And I know in my engagements with industry, there are a lot of companies out there that are subsystem providers and vendors. Some of it's software related, some of it is hardware. Their challenge is really with those manufacturers. You know, having the confidence among those manufacturers to say, yes, I can rely on you. You can integrate it effectively. And we're seeing that a lot, is folks with really great technology and great ideas, but they have to rely on a larger bus or satellite manufacturer to be able to do it. So, OK.

How about – so Bob Vince of Lawrence Livermore says: So we're talking about the survivability of commercial allied and our national security sensor network becomes more critical. When you think about that and you think about resilience, do you and the NRO, the members of the NRO, think about resilience only in terms of your systems and your capabilities and your networks? Or do you take into account there are perhaps other means by which a mission area, or a set of data, or a customer can have resilience that that can come from other places?

Dr. Scolese: We do. We very much do. And our architecture now, it does rely, as I said, on some commercial aspects of it. You know, certainly for buses and our proliferator architecture and launch, for our launch, but also in terms of the data that we're providing. And it's so it – is part of our strategy. And we work with our customers so that we all understand what we're relying on. It also – you know, just fundamentally it complicates our adversaries' thought process because, you know, do you go after the commercial system or do you go after the government system? Which one is the one that's providing the data, you know, most quickly, or in the areas that you need it, or, you know, you fill in the blank? You know, how is it being utilized? And you can even expand it to our international partners, where we work very, very, very closely with them. And we rely much more on our international partners.

This is probably a broader question for, you know, the functional managers to answer, but from a constellation standpoint, we are relying on them. And one of the reasons that we want to keep on bringing commercial organizations in, because not all of them are actually companies – I probably shouldn't call them commercial – other organizations into the NRO in our – what we call our – you know, our commercial office, is to bring them in at the earliest point that they're interested in participating with us so they can see what it is that we do, they can understand how – the whatever it is they're going to – they're going to do, whether it's a radar or an RF or it's a hyper spectral instrument. How that data is going to be used and, if it is going to be

used, what has to happen. And what are the expectations for its survivability?

Now that doesn't mean they have to harden their systems or anything else, but how do they work with us, how do they work with Space Command so that they can operate in the way that best preserves their ability to deliver information, right? So we want to get there as early as possible with our commercial or international partners, so that we can all work together and understand, you know, where and how we can integrate to maximize the reliability of the broad constellation.

Gen. Thompson: All right. Let me – let me try – I'm going to try one more question here, then I'm going to let you finish with whatever it is you think we should be talking about that we haven't talked about yet, OK?

William Priestner from the Georgetown Space Initiative: So the NRO has pioneered the idea of buying commercial ISR data to provide to customers to meet their needs. And maybe it's the commercial data, maybe it's your data. Do you see that as – is that the model that should prevail in the future, is customers tell you what their needs are and you figure out should we be buying commercial data to help them, should we provide them with our organic assets? Or, path B, which is customers can decide whether they want to go out and buy commercial data, or we can provide them the data we have from our much more capable systems? Should the NRO be in that commercial data-buying path long term, or is there a different way to go? What do you think about that?

Dr. Scolese: It's an interesting way to look at it. I think that's a – probably we need to be involved in it, I believe, because there, as you actually said in the very beginning, there are going to be some things that are going to be very, very difficult to do, or really don't have any commercial value. They're really focused on some very, very specific intelligence problem that either we want to protect and we don't want anybody to know that we can do it, or it just doesn't have any commercial value whatsoever. So you're going to need that.

But being engaged with the commercial industry gives us the opportunity to figure out where that boundary is, and I expect that boundary is going to get – is very fluid. As commercial develops more capability, we're going to – you know, we're going to be more and more focused on either more difficult problems or totally different set of things, and therefore shifting where we go. So I think we need to be very much engaged in that, and that will help in understanding where it is.

And then understanding the reliability of the constellation is an area where the NRO can play a very significant role in understanding how does – how do all these pieces play together, because no one system is going to be, you

know, totally secure. But all of our systems together will be more secure than any one system, and we can, you know, work very, very effectively with more knowledge about what's going on.

How they get their data, I think, is a question for our functional managers. Today that model is we can deliver the data in the data stream when the functional manager says, yes, we trust this data source, and now we can – we can put it into the data stream right from the beginning so that they don't have to make that decision. But you know, fundamentally, how the data is shared and how the data is used is really, you know, the functional manager of the combatant command as appropriate.

Gen Thompson: Yeah. What we found – I had experience not in the commercial ISR sense, but in commercial SATCOM. In the Commercial SATCOM Office that's become the Commercial Services Office that moved from – that moved from DISA into Air Force Space Command and into the Space Force was it was really a matter of helping customers understand what they needed; helping them understand what was there to meet their needs; and then with the commercial companies both making sure that various parts of the U.S. government weren't paying twice for the same capability, number one; and, number two, that negotiating in bulk would then be able to get better terms and conditions and economies of scale.

So I think there's – my sense is there's probably a good role there into the future because you are the experts and really understand how this works and how it functions effectively, so.

Well, sir, thanks. Thanks for your time today, more importantly for what you continue to do for the nation every day.

By way of closing, anything else we should be thinking about talking about? Or how would you like to send your last message to the assembled group here today?

Dr. Scolese: I think you've asked a lot of really, really good questions, so there's not too much to say.

But I if I could leave you with anything, is we're in a challenging time. I don't need to go through it for anybody in this audience, certainly, recognizing what the threats are and what the challenges are and what the needs are. But we're also in a – in a time when we have an incredible technological revolution going on, and we need to take advantage of those technologies and deliver them to the nation to minimize the challenges and the threats that are out there. Not a trivial task. It's going to take, you know, the engineers and the policymakers to go off and figure out how to – how to make that happen. But it is something that I think the NRO is in the middle

of, and you know, we want to develop the best systems that can give the best information. But I think collectively, with the knowledge that you have in terms of technologies that you can bring to bear and policies that need to be adjusted, we can probably make things even better.

Gen. Thompson: All right. Thank you so much. I really appreciate it.

Dr. Scolese: Thank you. (Applause.)

(END.)